Christina M. Graves

Curriculum Vitae *(updated 2025)*

The University of Texas at Tyler
Department of Mathematics
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Education

Ph.D. in Mathematics 2009
Syracuse University, Syracuse, NY
- Advisor: Jack Graver
- Dissertation Title: *On the Structure of Reliability Polynomials*

Master of Science in Mathematics 2005
Syracuse University, Syracuse, NY

Bachelor of Science in Mathematics and Computer Science 2002
Eastern Illinois University, Charleston, IL
- Summa Cum Laude
- University Honors and Departmental Honors

Employment

Distinguished Teaching Professor, *The University of Texas at Tyler*	2023–present
Professor, *The University of Texas at Tyler*	2018–2023
Associate Professor, *The University of Texas at Tyler*	2015–2018
Assistant Professor, *The University of Texas at Tyler*	2009–2015
Teaching Assistant, *Syracuse University*	2003–2009

Honors

UT Tyler Distinguished Faculty Fellow	
UT Tyler Academy of Distinguished Teachers Founding Fellow	
UT Tyler Inaugural Faculty Fellow in Undergraduate Research	2013–2017

Awards

President's Scholarly Achievement Award 2023
Awarded $2,500 by *The University of Texas at Tyler*

Regents' Outstanding Teaching Award 2014
Awarded $25,000 by *The University of Texas System*

Research Award 2013–2014
Awarded by the Office of Research and Technology Transfer at *The University of Texas at Tyler*

UT Tyler Faculty Fellow 2013–2016
Awarded $25,000 by *The University of Texas at Tyler*

White Fellowship for Teaching Excellence 2012
Awarded $2,500 by *The University of Texas at Tyler*

Donald E. Kibbey Prize in Mathematics 2009
Awarded $1,500 by *Syracuse University Mathematics Department*

Certificates

Certificate in Effective Teaching Practices 2025
  Awarded by *Association of College and University Educators*
Excellence in Teaching & Innovation: Level Two Certificate 2016
  Awarded $2,500 by *The University of Texas at Tyler*
Excellence in Teaching & Innovation: Level One Certificate 2015
  Awarded $1,500 by *The University of Texas at Tyler*
Certificate in University Teaching 2009
  Awarded by *Syracuse University Graduate School*

Publications

1. Cyclic permutations avoiding patterns in both one-line and cycle forms, with K. Archer, E. Borsh*, J. Bridges*, and M. Jeske, submitted December 2023.

2. Pattern-restricted one-cycle permutations with a pattern-restricted cycle form, with K. Archer, E. Borsh*, J. Bridges*, and M. Jeske*, to appear in *Enumerative Combinatorics and Applications* (2024).

3. Fixing numbers of graphs with symmetric and generalized quaternion symmetry groups, with L.-K. Lauderdale, *Graphs and Combinatorics* **40**, 14 (2024). DOI: 10.1007/s00373-023-02742-9.

4. More reliable graphs are not always stronger, *Networks*, **81** (2023), 490–498. DOI: 10.1002/net22141

5. A new statistic on Dyck paths for counting 3-dimensional Catalan words, with K. Archer, *Discrete Mathematics*, **346 (3)** (2023). DOI: 10.1016/j.disc.2002.113247

6. Pattern restricted permutations composed of 3-cycles, with K. Archer, *Discrete Mathematics*, **345 (7)** (2022). DOI: 10.1016/j.disc.2022.112895

7. Most reliable two-terminal graphs with node failures, with I. Brown*, B. Miller*, and T. Russell*, *Networks* (2020). DOI: 10.1002/net.21968

8. Network reliability: heading out on the highway, with J. Brown, C. Colbourn, D. Cox, and L. Mol, *Networks* (2020). DOI: 10.1002/net.21977

9. Counting acyclic and strong digraphs by descents, with K. Archer, I. Gessel, and X. Liang*, *Discrete Mathematics*, **343(11)** (2020). DOI: 10.1016/j.disc.2020.112041

10. Classes of uniformly most reliable graphs for all-terminal reliability, with K. Archer and D. Milan, *Discrete Applied Mathematics* **267** (2019), 12–29.

11. Vertex-minimal graphs with dihedral symmetry II, with L.-K. Lauderdale, *Discrete Mathematics* **342** (2019), 1378–1391. DOI 10.1016/j.disc.2018.12.028

12. On uniformly most reliable two-terminal graphs, with H. Bertrand*, O. Goff*, and M. Sun*, *Networks* **72** (2018); 200–216. DOI:10.1002/net.21811

13. Smallest graphs with given generalized quaternion automorphism group, with S. Graves and L.-K. Lauderdale, *Journal of Graph Theory* **87** (2018), 430–442. DOI: 10.1002/jgt.22166

14. Vertex-minimal graphs with dihedral symmetry, with S. Graves and L.-K. Lauderdale, *Discrete Mathematics* **340** (2017), 2573–2588. DOI: 10.1016/j.disc.2017.06.019

15. Extending patches to fullerenes, with J. McLoud-Mann and K. Stagg, *Ars Mathematica Contemporanea* **9** (2015), 219-232.

16. Fullerene patches II, with J. Graver and S. Graves, *Ars Mathematica Contemporanea* **7** (2014), 405-421.

17. Reliability polynomials with arbitrarily many inflection points, with D. Milan, *Networks* **64(1)** (2014), 1–5. DOI: 10.1002/net.21551

18. Counting symmetric and near-symmetric fullerene patches, with S. Graves, *Journal of Mathematical Chemistry* **52** (2014), 2423–2441. DOI:10.1007/s10910-014-0393-2

19. Side lengths of pseudoconvex fullerene patches, with J. McLoud-Mann, *Ars Mathematica Contemporanea* **5** (2012), 291-302.

20. Non-recursively constructible recursive families of graphs, with C. Bouey*, A. Ostrander* and G. Palma*, *The Electronic Journal of Combinatorics* **19(2)** (2012), #P9.

21. Inflection points of coherent reliability polynomials, *Australasian Journal of Combinatorics* **49** (2011), 111-126.

22. Fullerene patches I, with J. Graver, *Ars Mathematica Contemporanea* **3** (2010), 104-120.

* denotes undergraduate co-authors

Grant Experience

NSF Research Experience for Undergraduates (Co-PI)   2022–2024
    Awarded \$311,154 to host a REU at UT Tyler for three summers
    Awarded an additional \$64,520 from UT Tyler to support the program

NSF Research Experience for Undergraduates (Co-PI)   2017–2019
    Awarded \$254,443 to host a REU at UT Tyler for three summers
    Awarded an additional \$56,906 from UT Tyler to support the program

NSF Research Experience for Undergraduates (Co-PI)   2014–2016
    Awarded \$258,739 to host a REU at UT Tyler for three summers

Sonia Kovalevsky High School Mathematics Day Grant (PI)   2011
    Awarded a conference grant of \$1,230 funded by the Association for Women in Mathematics

The University of Texas at Tyler Faculty Research Grant (PI)   2011
    Awarded a grant of \$4,000 to work on "Ambiguous Fullerene Patches"

NSF Research Experience for Undergraduates (Senior Personnel)   2011
    Supervised and assisted a group of 3 students in undergraduate research

Conference Research Presentations

Pattern avoidance in one-line and cycle form (with K. Archer, et al)
    AMS Eastern Sectional Meeting,   2024
Catalan words and 321-avoiding permutations (with K. Archer)
    AMS Southeastern Sectional Meeting, Chattanooga, TN   2022

A new statistic on Dyck paths (with K. Archer)
  Joint Mathematics Meetings (virtual)   2022
Pattern-restricted permutations composed of only 3-cycles (with K. Archer)
  Texas A&M Combinatorics and Algebra Seminar, College Station, TX   2020
  AMS Southeastern Section Meeting, University of Florida, FL   2019
Uniformly most reliable two-terminal networks
  CombinaTexas 2019 Meeting, College Station, TX   2019
  Texas Christian University Colloquium, Fort Worth, TX   2018
Vertex Minimal Graphs with Dihedral Symmetry (with S. Graves and L.-K. Lauderdale)
  Joint Meetings of the AMS and MAA, Atlanta, GA   2017
  CombinaTexas 2016 Meeting, College Station, TX   2016
Smallest Graphs with Given Automorphism Group (with S. Graves and L.K.-Lauderdale)
  AMS Spring Western Section Meeting, Salt Lake City, UT   2016
Smallest Graphs with Quaternion Automorphism Group (with S. Graves and L.-K. Lauderdale)
  Texas Section MAA Conference, San Antonio, TX   2015
Reliability Polynomials with Arbitrarily Many Inflection Points (with D. Milan)
  MathFest, Portland, OR   2014
Extending Patches to Fullerenes (with J. McLoud-Mann and K. Stagg)
  Joint Meetings of the AMS and MAA, Baltimore, MD   2014
Inflection Points of Reliability Polynomials (with D. Milan)
  CombinaTexas 2013 Meeting, Houston, TX   2013
Counting Fullerene Patches (with S. Graves)
  CombinaTexas 2013 Meeting, Houston, TX   2013
Side Lengths of Pseudoconvex Fullerene Patches (with J. McLoud-Mann)
  Joint Meetings of the AMS and MAA, San Diego, CA   2013
Boundaries of Nice Fullerene Patches
  CombinaTexas 2012 Meeting, Georgetown, TX   2012
Boundary Conditions of Fullerene Patches
  Texas Section MAA Conference, Dallas, TX   2012
All Fullerenes Great and Small
  Stephen F. Austin University Colloquium, Nacogdoches, TX   2011
Ambiguous Fullerene Patches
  5th Computers in Scientific Discovery Conference, Sheffield, England   2010

Teaching Presentations

Innovations and Excellence in the Classroom
  UT Tyler New Faculty Orientation   2024
Defining and Teaching for Student Success
  UT System Academy of Distinguished Teachers 2020 Winter Conference   2020
Undergraduate Research at UT Tyler
  UT Tyler Faculty Development Workshop   2017
Actively Engaging Students: A Panel Discussion (with S. Doty, C. Major, and B. Woolridge)
  UT Tyler Faculty Development Workshop   2016
Innovative approaches to classroom learning (with L.-K. Lauderdale)
  Texas Section MAA Conference, Nacogdoches, TX   2016
Friday Fun Day! (with S. Graves and L.-K. Lauderdale)
  UT Tyler Faculty Development Workshop   2016
Incorporating Undergraduate Research as a Capstone Project
  Texas Section MAA Conference, San Antonio, TX   2015

Incorporating an Undergraduate Research Component in your Major
UT Tyler Faculty Development Workshop   2015
Mentoring Undergraduate Research
UT Tyler Faculty Development Workshop   2014, 2015
Giving a Good Math Talk
UT Tyler REU   2014-2019 (annually), 2022
Teaching Moment: Blind Journals
UT Tyler Faculty Development Workshop   2014
Faculty Sharing Session: Technology in the Technical Classroom
UT Tyler Faculty Development Workshop   2012
Interdisciplinary Lecture Series (with J. McLoud-Mann)
Joint Meetings of the AMS and MAA, Boston, MA   2012
How to Give a Good Math Talk
UT Tyler REU   2011

Student Presentations

UT Tyler Math Club Talks
Math Balderdash   2012, 2017, 2018
Can you hear me now? My network is better than yours   2016, 2018
Competition: Writing the number 1   2016
Math and fullerenes   2015
Math Jeopardy   2014
Sit or stand: Fun with dice   2014
The stability of fullerenes   2012
How many pentagons are on a soccer ball?   2011
Which strategy is best?   2009
Sonya Kovalevsky Day Talk, *Tyler, TX*
Dice Game Strategies   2010

Mentoring

Senior Capstone Projects

B. Cook, "Latin Squares and Sudokus"   2022
D. du Preez, "Most Reliable Graphs with 8 vertices and 21 edges"   2021
A. Delgado, "Coloring Symmetric Shapes"   2019
K. McDaniel, "Ramsey Numbers"   2016
J. Benton, "Game Theory and the Prisoner's Dilemma"   2015
T. Arnold, "Dots-and-Boxes"   2014
L. Thomas, "A Generalized Currency System"   2014
K. Prince, "Generalizing Optimization Problems"   2013
L. Edwards, "Counting Magic Squares"   2012
B. Williamson, "The Lottery Problem"   2012
L. Yankie, "Efficient Two-Coin System   2010
M. Field, "Algebraic Graph Theory: Hamiltonian Paths"   2010

Research Experience for Undergraduates Mentor

L. Barksdale, M. MacDonald, and R. Maleki, "Two-terminal reliability and N-vector behavior"   2022
I. Brown, B. Miller, and T. Russell, "Most reliable two-terminal graphs with node failures"   2019
E. Liang, M. Martinez, and V. Osterman, "Inversions in directed acyclic graphs"   2018
A. Howard, C. Lewis, and K. Short, "Two-terminal reliability of graphs with terminal distance 3 or 4"   2017
H. Bertrand, O. Goff, and M. Sun, "Non-existence of uniformly most optimal 2-terminal graphs"   2016

K. Flanagan, B. Molokach, and R. Olugbemi, "Extending 5-Spirals to Fullerenes" — 2015
C. Cornelus, J. Erickson, and H. Goetz, "Reliability of Recursively Constructed Graphs" — 2014
C. Bouey, A. Ostrander, and G. Palma, "A Counterexample of a Conjecture of Noy and Ribo" — 2011

Master's Thesis Advisor

M. Field, "Survey of Line Graphs and Hamiltonian Cycles" — 2011–2012

Master's Thesis Committee Member

J. Woodruff, "Vertex minimal graphs with given automorphism group" — 2016
A. Chick, "Behavior of Petrie lines in certain edge-transitive infinite graphs" — 2017

MAA Project NExT Consultant

Teaching mentor for new math hires in Texas — 2017–2018

Service to University

Department Service

Department Tenure and Promotion Committee (Chair)	2019
Department Hiring Committee (Chair)	2017, 2018, 2019
Department Curriculum Committee (Chair)	2018–present
Department Governance Committee (Chair)	2018, 2019
Department Awards Committee (Chair)	2018, 2024
Department Awards Committee	2017, 2020
Department Tenure and Promotion Committee	2015–present
Department Bulletin Board Organizer	2010–2017
Department Technology Committee	2015, 2016
Department Student Workers Committee	2014, 2015
Department Honors Committee (Chair)	2015
Department Hiring Committee	2011, 2014, 2016, 2022
Department Graduate Committee	Biennially
Department Curriculum Committee	Biennially
Department Student Advisor	2009–present
Department Master's Exam Committee Member	2010–present

College of Arts and Sciences Service

Department of Chemistry Tenure and Promotion Committee	2023
College of Arts and Sciences Tenure and Promotion Committee (Chair)	2022
College of Arts and Sciences Tenure and Promotion Committee	2021
College of Arts and Sciences Curriculum Committee (Chair)	2019–2020
College of Arts and Sciences Curriculum Committee	2018–2019
College of Arts and Sciences Governance Committee	2013–2015
College of Arts and Sciences Commencement Committee	2009–2011

University Service

Department of Mechanical Engineering Post-tenure Review Committee	2024
Faculty Awards Committee	2024–present
Student Appeals Committee	2020–2023
Vice Provost of Research & Scholarship Search Committee	2019
Parental Leave Policy Ad-hoc Committee	2019
Director of Research & Scholarship Search Committee	2018
Student Research Faculty Learning Community	2018

UT Tyler Academy of Distinguished Teachers Founding Fellow	2020–present
UT Tyler Academy of Distinguished Teachers (Secretary)	2016–2020
University Faculty Awards Committee	2014–2017
University Distance Education Advisory Committee	2017
Graduate School Representative for Doctoral Defense	2017
Teaching Excellence and Innovation Initiative Member	2012, 2013
University Core Curriculum Initiative Member	2012

Service to Students

UT Tyler "Lyceum: Student Research Showcase"

Judge for student posters and presentations   2016, 2018, 2020, 2021
Organizer for a campus-wide research showcase   2016, 2017

Math Club Advisor   2011–2016, 2019–2020

Organized an interdisciplinary lecture series with other departments on campus
Organized biweekly meetings average over 40 attendees per meeting

Co-curricular Awards   2012, 2013, 2016

Awarded $800 to travel with 13 undergraduates to MAA Texas Section meeting in Nacogdoches, TX
Awarded $800 to travel with 6 undergraduates to MAA Texas Section meeting in Lubbock, TX
Awarded $769 to travel with 3 undergraduates to Nebraska Conf. for Undergraduate Women in Math
Awarded $579 to travel with 6 undergraduates to MAA Texas Section meeting in Dallas, TX

Putnam Exam Coordinator   2009–2012

Organized weekly practices for undergraduates competing in the national Putnam exam

Master Advisor   2009–present

Completed four training modules on becoming a better academic advisor
Formal advisor to over twenty math majors

Service to Profession

Associate Editor for *Networks*   2020–present

Invited Journal Referee

AIMS Mathematics, Algorithmica, Discrete Applied Mathematics, Discrete Mathematics,
Discrete Mathematics and Theoretical Computer Science,
Discussiones Mathematicae Graph Theory, IEEE Transactions on Reliability,
International Transactions in Operational Research, Journal of Algebraic Combinatorics,
Networks, Theoretical Computer Science

Invited Reviewer of Discovery Grant applications for NSERC   2016, 2017

Career Panelist   2016

Tyler Junior College STEAM Career Day

Young Mathematicians Conference Abstract Judge   2015

Judged over 100 undergraduate research abstracts.

Texas Undergraduate Mathematics Conference Organizer   2015

Co-organized the 11th Annual Texas Undergraduate Mathematics Conference

Career Panel Moderator   2010, 2015

6th Annual Texas Undergraduate Mathematics Conference
11th Annual Texas Undergraduate Mathematics Conference

Combinatorics Room Organizer   2012
   Texas Undergraduate Mathematics Conference

Faculty Sharing Session Speaker   2012
   Led a workshop on how to use different technology in the classroom.

MAA Conference Food Committee Chair   2010–2011
   Organizer of all meals and snacks for the Texas Section MAA conference.

Service to K-12 Education

Guest speaker at Tyler Legacy High School
   "How many pentagons are on a soccer ball?" Math Honor Society Presentation   2025

Question and Answer Session with Keller Collegiate Academy   2024

Academic Rodeo Presenter   2022

Reader for AP Statistics Exams   2020

Guest speaker at Owens Elementary
   "Dice Sum Distributions," 4th grade presentation   2018
   "Edible 3D Shapes," Kindergarten presentation   2017
   "Bouncing Ball Height Comparisons," 3rd grade presentation   2017, 2018
   "Dice Probabilities," 2nd grade presentation   2017
   "Math and Fruit Loops," 1st and 2nd grade presentation   2016

High School Pentathlon Contributor   2014
   East Texas State Fair

Sonya Kovalevsky Day Committee (member, chair)   2010, 2011
   Organized a Sonya Kovalevsky Day conference at UT Tyler for high school females.

Service to Community

Catholic Charities Board Member   2016–2021
Faith Formation Teacher   2015–present
   5th grade religion teacher at St. Mary Magdalene Church, Flint, TX
Vacation Bible School Organizer   2013–2017

Teacher Training

UT System Academy of Distinguished Teacher's Conference on Teaching in Texas   2021
UT System Academy of Distinguished Teachers - 2020 Winter Conference   2020
Project NExT Workshops
   Texas Section MAA Conference, Nacogdoches, TX   2016
   Texas Undergraduate Mathematics Conference, Tyler, TX   2015
   Texas Section MAA Conference, San Antonio, TX   2015
   Texas Section MAA Conference, Tyler, TX   2011
   Texas Section MAA Conference, Abilene, TX   2010
   Texas Undergraduate Mathematics Conference, Huntsville, TX   2009
Faculty Development Workshops at *UT Tyler*
   Syllabus Design: From Boring to Bravo!   2024
   Problem-Based Learning in Precalculus   2024
   Positive Identity in the Classroom: Belonging, Value, and Student Engagement   2022

Small Teaching - Everyday Lessons from the Science of Learning	2022
Connecting with Students in an Online Environment	2020
Online Proctoring	2020
Faculty Learning Community on Work-Life Balance	2019
Celebration of Service Learning	2018
Service Learning Showcase	2017
Canvas 101	2017
Changing the Culture: Teaching Students how to Brand their Skills and Abilities	2017
Teaching Town Hall: Millennial Students and Digital Distractions	2017
Digital Storytelling Apertures: Mobile Green Screens and Beyond	2017
Raising Students Metacognitive Awareness of Reading Strategies	2017
Re-visioning Research's Think-Aloud Protocol	2017
Teaching Town Hall: Undergraduate Research	2017
Actively Engaging Students	2016
Building Bridges Between K-12 and Higher Education	2016
Teaching Town Hall: A Celebration of Teaching	2016
Improving Student Retention	2016
Introduction to Teaching & Learning	2015
Tips for Developing and Maintaining Industry Relationships for Faculty	2015
Using Games for Informal Assessment	2015
UT Tyler Symposium on Research and Creativity	2015
Collaboration in Group Work	2015
Designing for Instructor Presence	2015
Blackboard Grade Center and Retention Center	2015
Video Lecturing	2015
Zoom Training	2015
Introduction to Online Teaching & Learning	2015
Evaluating Participation and Discussion	2015
Revising Your Course	2015
Meaningful Discussions	2015
Building Community	2015
Open Educational Resources	2015
Teaching Moments	2014
The Flipped Classroom	2014
The Online Classroom	2012
Classroom Management	2011
The Inclusive Classroom	2011
Tegrity: Capturing the Classroom	2011

Minicourse at *MathFest 2014*, Portland, OR   2014

Instructional Supports for Implementing Inquiry-Oriented Curricula

Online Mathematica Seminar - Topics in First Year Calculus   2010

Courses Taught

MATH 1325 - Mathematics for Business and Economics II
MATH 1342 - Statistics
MATH 2113 - Calculus I Computer Lab (supervising instructor)
MATH 2114 - Calculus II Computer Lab (supervising instructor)
MATH 2330 - Discrete Mathematics
MATH 2312 - Precalculus
MATH 2413 - Calculus I

MATH 2413 - Calculus I (*online section*)
HNRS 2413 - Honors Calculus I
MATH 2414 - Calculus II
HNRS 2414 - Honors Calculus II
MATH 3104 - Multivariate Calculus Computer Lab (supervising instructor)
MATH 3203 - Matrix Methods
MATH 3305 - Ordinary Differential Equations
MATH 3336 - Abstract Algebra I
MATH 3336 - Abstract Algebra I (*online section*)
MATH 3345 - Real Analysis I
MATH 3351 - Probability and Statistics for Engineers and Scientists
MATH 3425 - Foundations of Mathematics
MATH 3404 - Multivariate Calculus
MATH 4160 - Senior Seminar I
MATH 4161 - Senior Seminar II
MATH 4336 - Abstract Algebra II
MATH 4350 - Theory of Probability
MATH 4351 - Applied Statistics
MATH 5322 - Graph Theory (graduate course)
MATH 5331 - Algebraic Structures (graduate course)
MATH 5333 - Topics in Algebra (graduate course)
MATH 5391 - Combinatorics (graduate course)
MATH 5391 - Topics in Graph Theory (graduate course)
MATH 5391 - Combinatorial Game Theory (graduate course)